

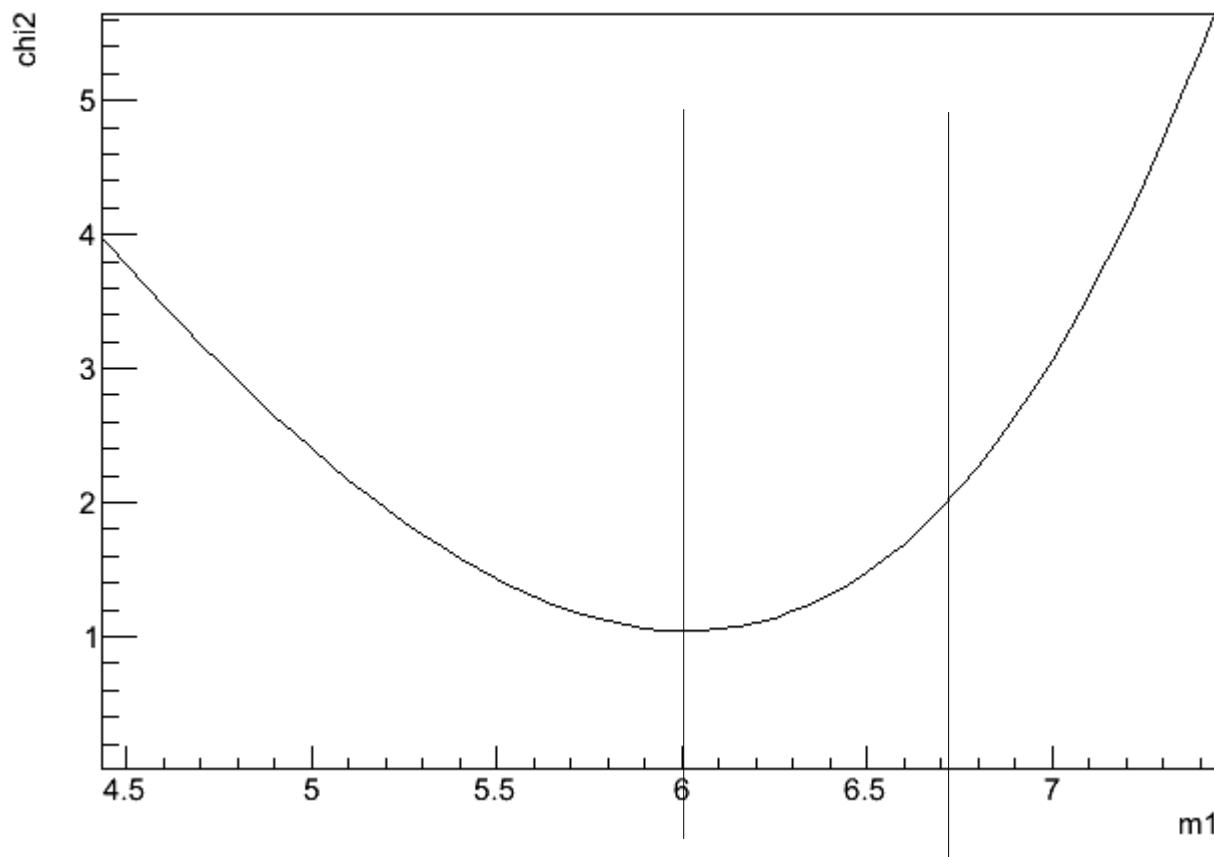
nu e Weekly Meeting

Wenting Tan
Hampton University
Dec5/2012

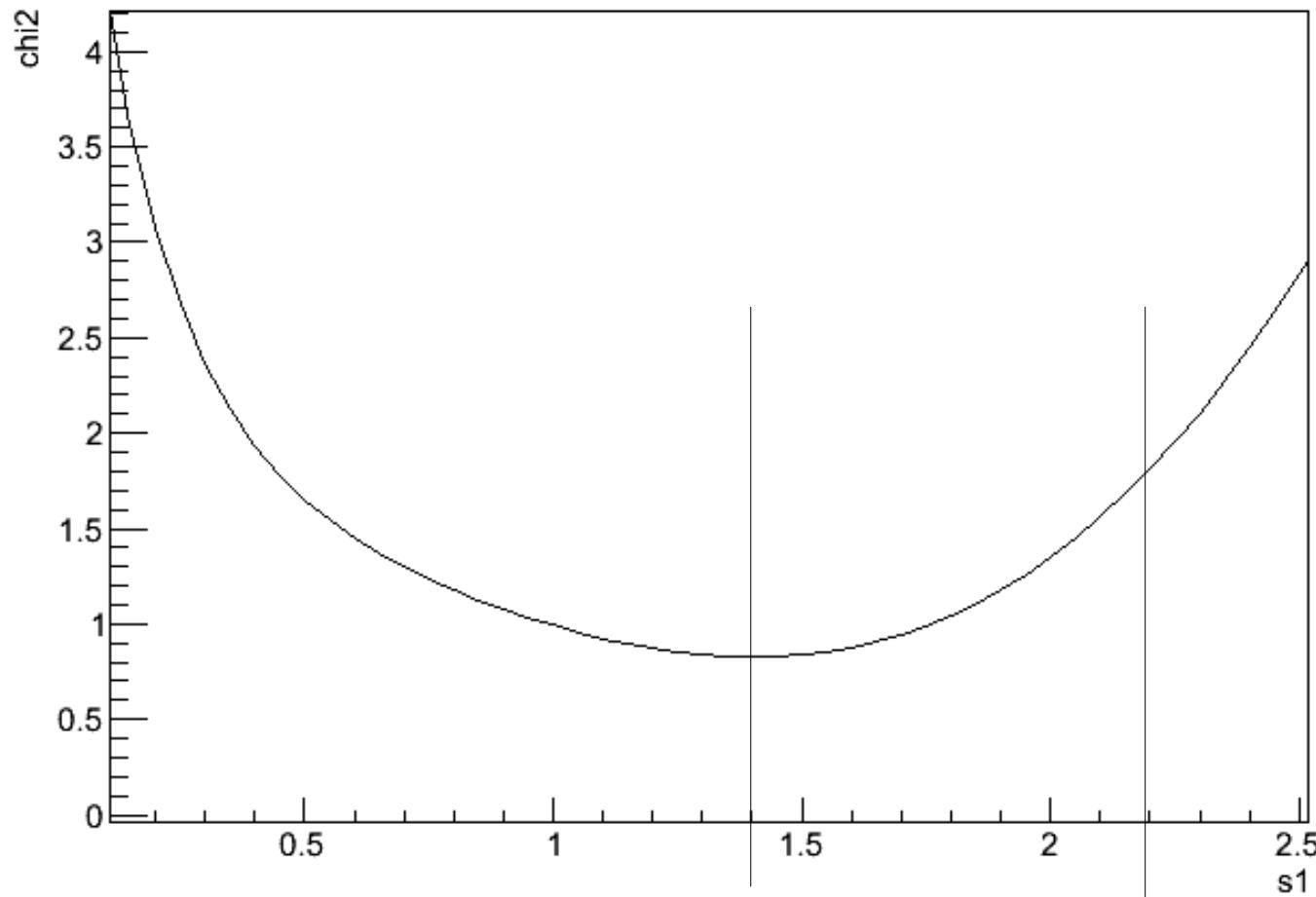
Discussion on Tminuit Error Study

Name	Value	TMinuit Fitting Mean	Fitted Par Hist Gaus 1sigma	Chi2(Range0-12GeV) changes by 1, the par changes	Average Tminuit Fitting Error
a1	1.610e+17	Fixed--	--	--	--
m1	6.229	6.116	0.137	~0.7	0.969
s1	1.489	1.363	0.119	~0.8	0.957
a2	7.731e+16	Fixed--	--	--	--
m2	3.502	3.691	0.428	~2.8	4.588
s2	0.922	2.240	1.034	~2.5	2.084
a3	1.021e+16	Fixed--	--	--	--
m3	5.847	5.344	0.935	~2.9	2.577
s3	4.867	4.673	0.390	~3.0	1.699
Random Size, 100 sets of sample					

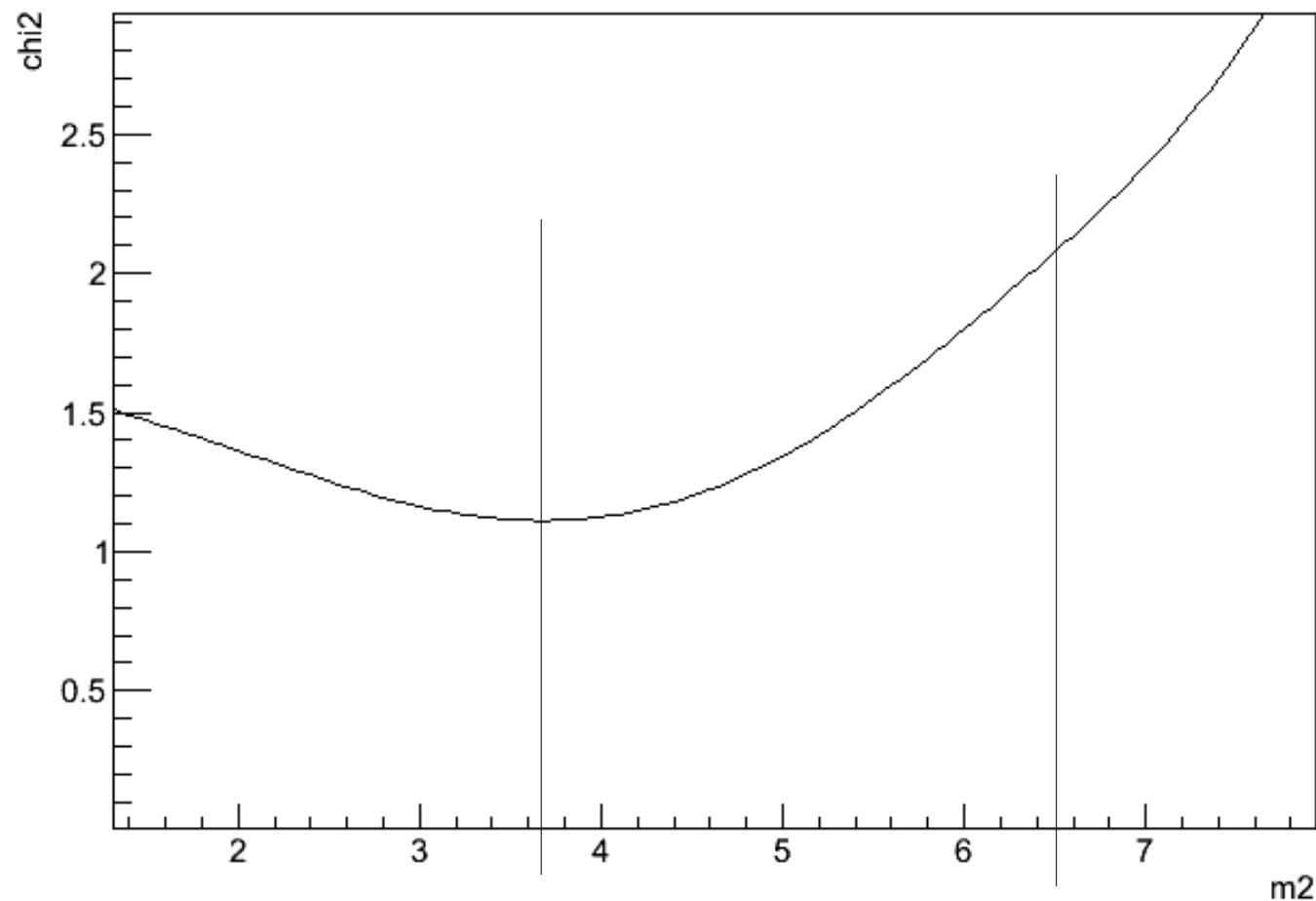
M1 chi^2 graph and error



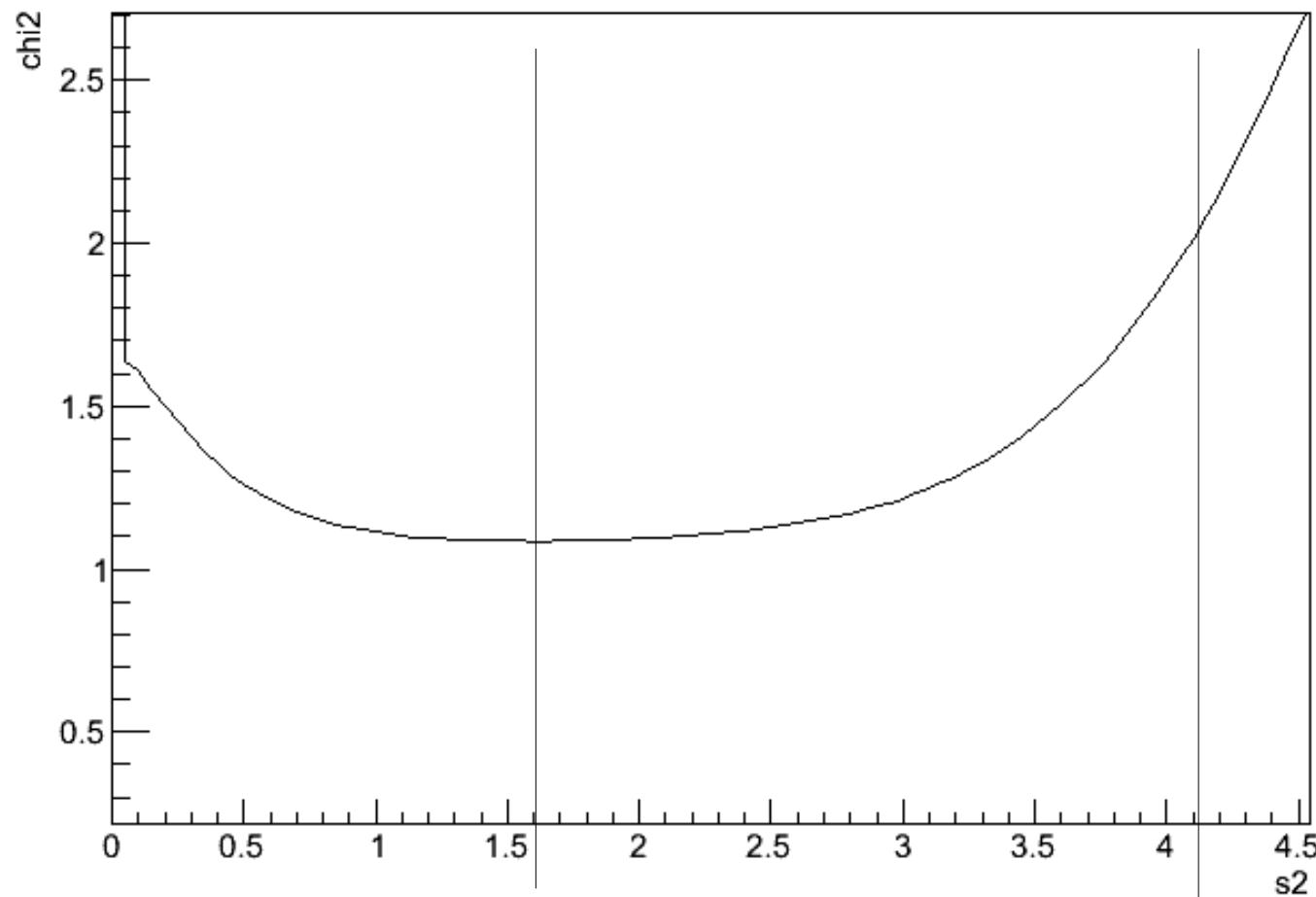
s1 chi^2 graph and error



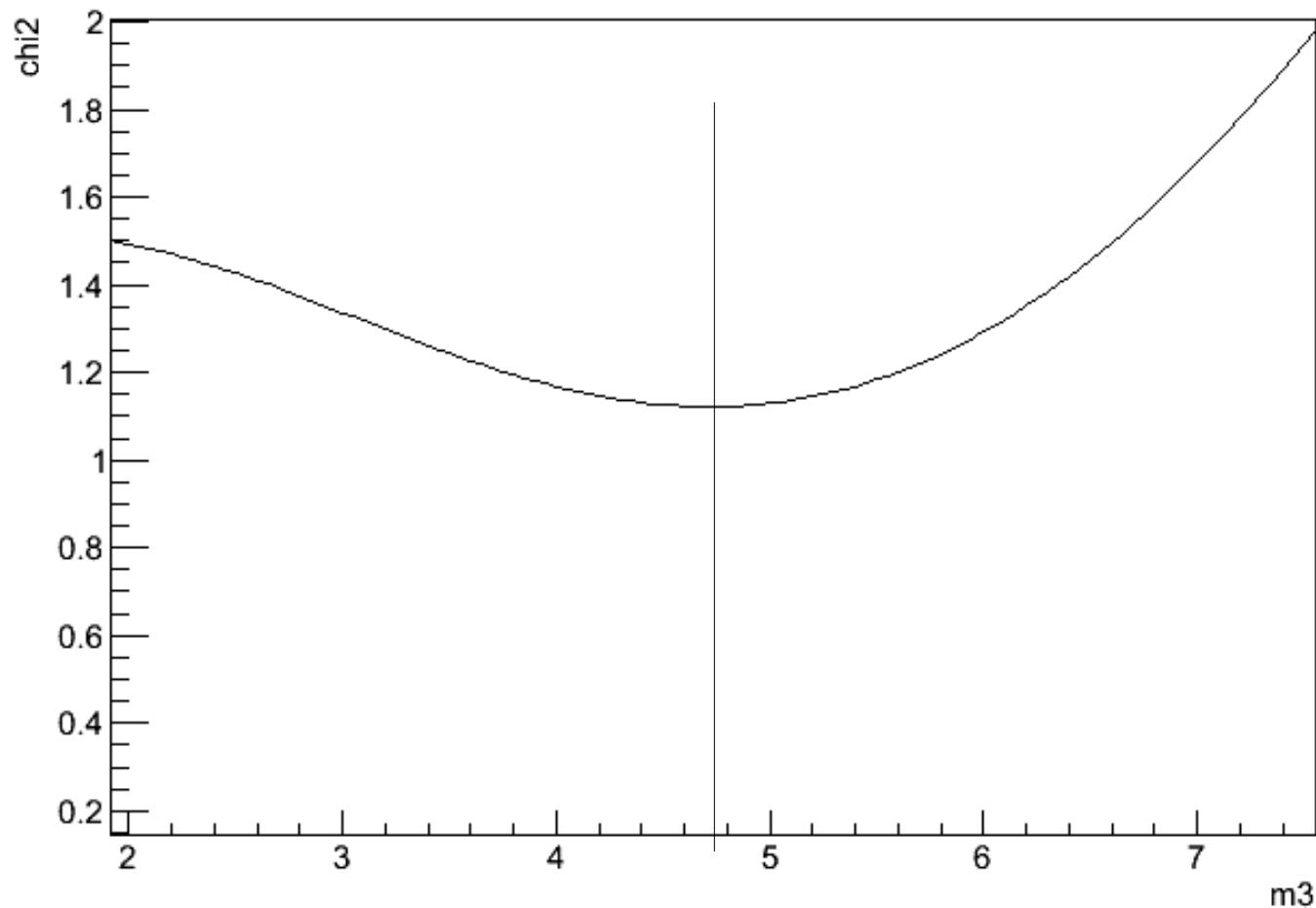
M2 chi^2 graph and error



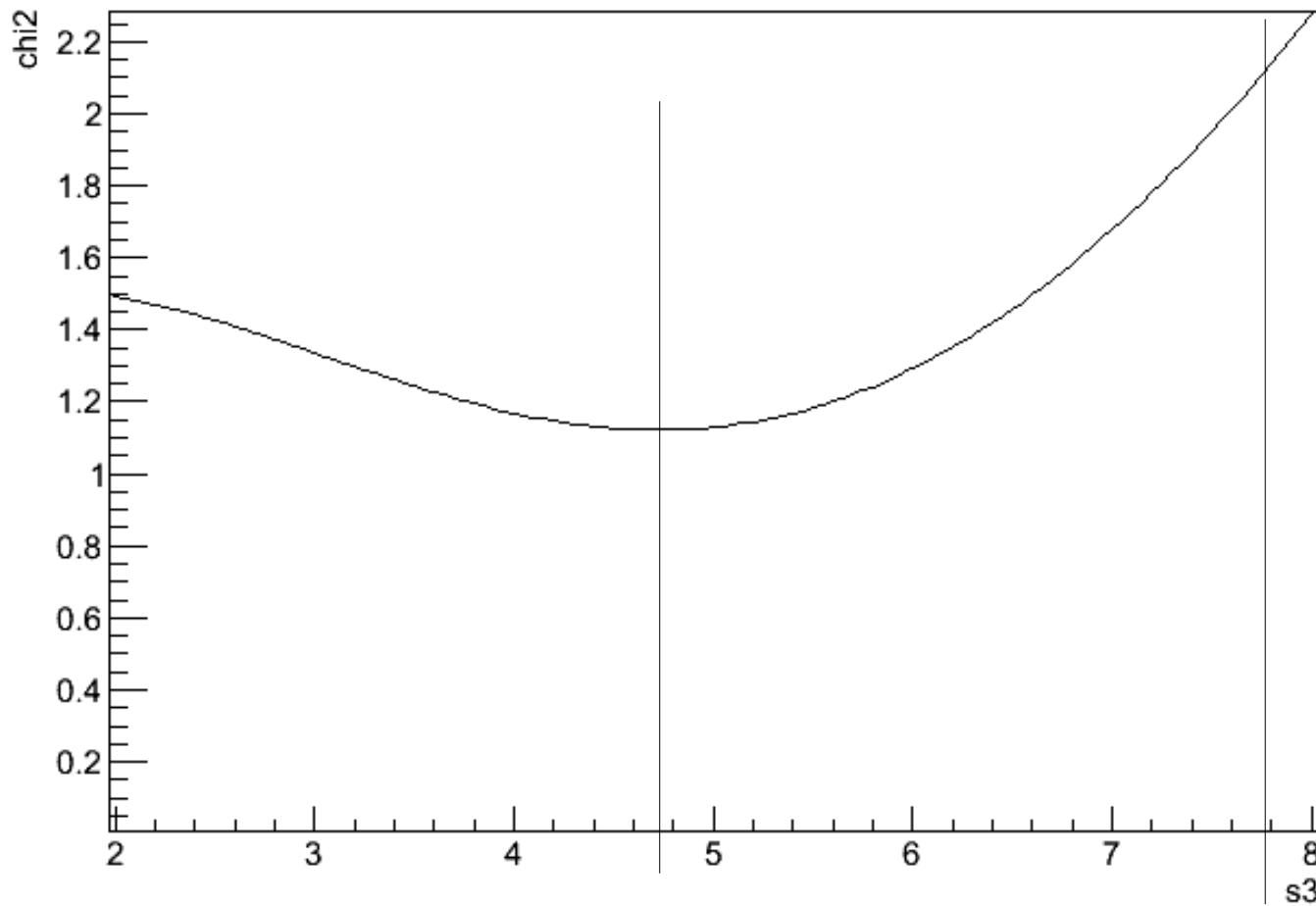
s2 chi^2 graph and error



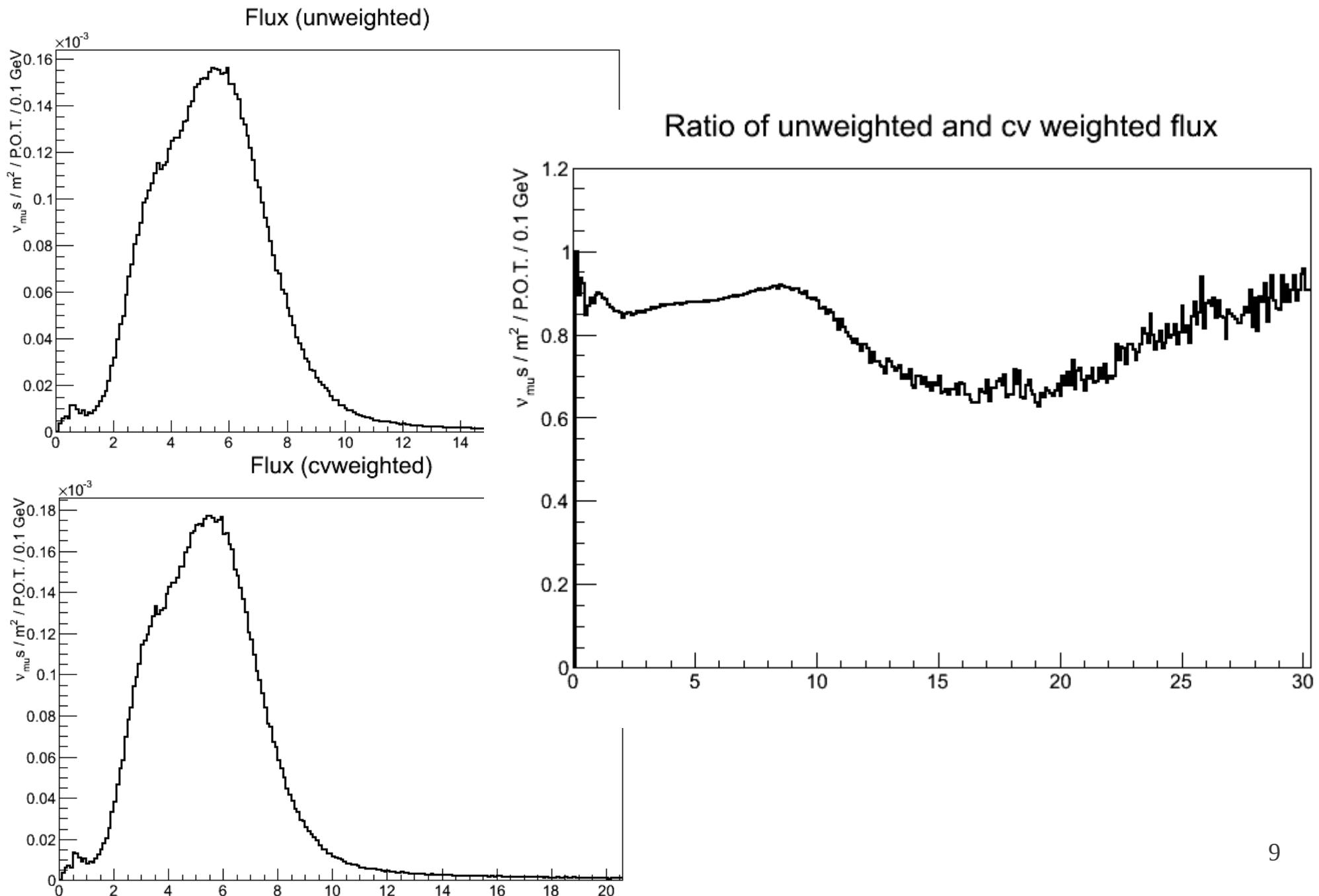
M3 chi^2 graph and error



s3 chi^2 graph and error



MINERvA Document 8253-v1



What is CV Reweighting?

- There are two reasons to reweight an existing Monte Carlo sample:
 1. It's challenging to implement exactly the physics model that you want (e.g. primary hadron production in G4)
 2. You want to include new information without regenerating existing large samples of Monte Carlo
- So, we add a weight to each simulated event
- Total Weight is combination of N individual weight values divided into two categories (flux & xsec)

for ν_μ

Absolute Event Rate

Theoretically

flux_E_unweighted_CV_WithErr: 2667 (per 20E20 POT)

flux_E_cvweighted_CV_WithErr: 3056 (per 20E20 POT)

Monte Carlo

Full Chain Simulation: Genie->Cal->Reco->ANA->EMShower(Jaewon's reco tool)->
Event selected in Tracking Fiducial. Mod: 25-84

3136 (per 20E20 POT)

Using wgt variable (cv re-weighting):

chain->Project("hdata","truth_E/1000","wgt*(truth_fiducial_evt==1 && mc_incoming==14")

hdata->Integral() = 2901 (per 20E20 POT)

Ke Prediction, POT normalization

$$\frac{dN(T)}{dT} = (\text{time}) \times (\text{No. of electrons}) \times \int dE_v * \frac{d\Phi(E_v)}{dE_v} * \frac{d\sigma(T, E_v)}{dT}$$

$$\frac{d\sigma}{dT} = \frac{2G_\mu^2 m_e}{\pi E_v^2} [a^2 E_v^2 + b^2 (E_v - T)^2 - ab m_e T]$$

$$s^2 = \sin^2 \theta_W \approx 0.23149 \pm 0.00015$$

$$G_\mu = 1.16637(1) \times 10^{-5} \text{ GeV}^{-2}$$

Available Electrons = 1.98 E30

$$\frac{2G_\mu^2 m_e}{\pi} = 1.5 \times 10^{-41} \text{ GeV}^{-1} \text{ cm}^2$$

flux_E_unweighted_CV_WithErr

200E20 POT

ElectronEnergy data and fit

